



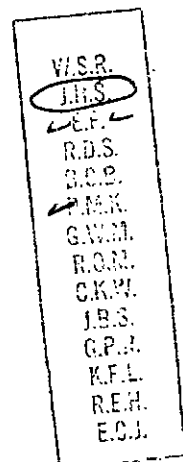
THE DOWA MINING COMPANY, LTD.

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March 25, 1969



Mr. J. H. Stovel
President
Kerr Addison Mines Ltd.
44 King Street West
Toronto 1, Ontario
Canada

Dear Mr. Stovel,

We apologize you for our being late in submitting you our test report on the Pb-Zn ore of your Vangorda property in Yukon. Enclosed is a brief report on our test result. We hope that it will receive your attention and whatever question you have, please do not hesitate to ask us.

Although the test was not always carried out satisfactorily as the given sample was not sufficient to cover all tests we wanted, the result is generally encouraging and we think, the qualities of each concentrates separated by our tests are commercialy marketable.

As you may notice from our report, recoveries are not satisfactory. But we feel that the sample might have not been free from weathering, and we have several tests left which, we believe, may improve the recoveries. Therefore, we are much interested to make further tests if more sample is available to us. Regardless to these tests, however, we are rather confident to obtain better recoveries at the industrial scale operation.

Under these circumstances, we would like to know your opinion whether you will go ahead with this project or not and also how you will do. We appreciate these information even though it might be rough indication at this stage. In this connection we are pleased to inform you that whenever you desire, we may be nearly to join with you as concentrate buyer or as partner.

Incidentally, I am planning to be in Toronto end April on my way back from South America and will be very happy to have an opportunity to exchange our opinion. I will advise you my schedule as soon as it is fixed.

Looking forward to hearing from you soon,

Yours very truly,

THE DOWA MINING CO., LTD.

Yoshitaru Suzuki
Y. Suzuki
Managing Director

THE DOWA MINING COMPANY, LTD.

TOKYO

Considerations on the Vangorda and Swim Lake ore

Mar. 17, 1969

Research Laboratory, the Dowa Mining Co.

1. Prior to the investigations on Vangorda and Swim Lake ores, test reports forwarded by 'the Department of Mines and Surveys, Mine Research, Canada' dated Feb. 1955 were sent to the Dowa Mining Co., Tokyo by the Toyo Minka Trading Co. The Dowa Company thought it necessary to study the conclusions of the Canadian people closely and to care about if there might be anything that contribute to them.

2. According to the Canadian Reports, excellent research about fundamental work had been performed at that time and that led to the conceptions as;

(a) tests on the hardness of the ores (such as determining work index for grindability)

(b) tests on the characteristics of grain size and the constituents of metals

(c) microscopic studies for the mineralization

these scopes could be left of considerations under the circumstances, while stress should be laid on the flotation tests with microscopic observations of minerals concentrated into the products.

3. Summary of the investigations are as follows:

(1) The crude ore should be ground to as fine as under 200 meshes to get rejectable wastes.

(2) The values are copper (chalcopyrite, chalcocite), lead (galena), zinc (sphalerite) and pyrite, though pyrite are thought to be recoverable by any means. So that tests were carried out to obtain (a) lead concentrate and zinc concentrate, (b) copper, lead and zinc concentrate. Since the grade of final concentrate are expected to be of salable ones such as over 50% Pb or Zn, straight differential flotation method were preferred.

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(3) In case of (a), on the Swim Lake ores; Pb recovery 71%, that of Zn 75%, on the Vangorda ores; 77% Pb and 60% Zn recovery.

In case of extraction of copper (b), 49% copper recovery at 11.7% Cu concentrate, 60% Pb recovery and 63% Zn recovery on Swim Lake ores; 44% copper recovery at 6.8% Cu concentrate, 78% Pb and 64% Zn recovery on Vangorda ores.

Such were the results obtained from thirty runs of tests.

(4) Evidently extraction of copper makes lead and zinc minerals disperse through every products on the Swim Lake ores, that is, recovery of Pb and Zn were lessend. Presumably that accounts for the effect of sulphur dioxide used at the top of flotation feed as the depressant for zinc minerals and pyrite. While on the Vangorda ores with less copper, the depressant would have not sufficient time to exert any influence on the flotability of zinc minerals: probably small amount of copper were floated quickly and sulphur dioxide could not do harm at residual minerals.

4. Attention might be paid on the facts that rather poor figures, recovery and grade of final products, would due to the testing method, the batch flotation test, from which operational informations should be confined to some extent within certain limitations since the values of middlings are excluded. Although the amount of samples sent to the research laboratory were not always small, 8 Kilograms of Vangorda ores and 17 Kilograms of Swim Lake ores, in conventional sense, continuous tests would require ten to thirty times of that amount if more details should be called for.

5. Shortly, as described above, economical estimations on copper extraction should be derived from more elaborate testing data than the ones presented here.

Staffs of the research laboratory have, however, an opinion that entirely new process (patent pending) performed successfully at Matsumine concentrator of the Dowa Mining Co., might do something to those Canadian ores and if more amount of samples should be available they are willing to push on further investigations and hoping to transfer their regards to the Canadian people.

Y. Takamura



Chief of the Research and Engineering
Department, the Dowa Mining Co.

Flotation Tests of Swim Lake and Vangorda Ore

Introduction

Since the samples of Swim Lake and Vangorda ore arrived at Kosaka, several flotation tests have been tried at research laboratory.

Metal content of each sample is as follows:

	Au	Ag(g/t)	Cu	Pb	Zn	Fe(%)
Swim Lake	0.5	64	0.28	3.25	4.21	24.87
Vangorda	0.5	64	0.14	4.05	5.13	20.71

Each sample was ground under 35 mesh by disk grinder for batch flotation tests. Then, each 1,000gm. sample was ground under 200 mesh by laboratory pebble mill.

Flotation tests were performed on the basis of following flowsheets: i.e.

1) Pb-Zn differential flotation 2) Cu-Pb-Zn differential flotation. Typical metallurgical results are described below.

1) Pb-Zn differential flotation

Preliminary tests were tried by various methods to separate Pb and Zn.

Consequently, NaCN method was found to be promising than others. So, several tests were performed according to the flowsheet, shown in fig. 1.

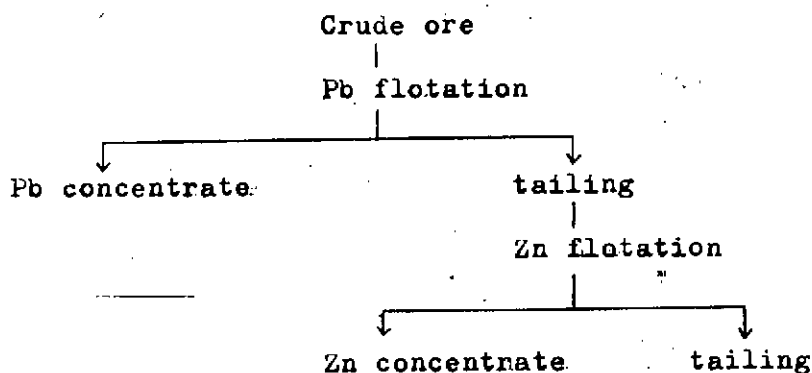


Fig.1 Flowsheet of Pb-Zn differential flotation

Typical metallurgical results are shown in Table 1 (Swim Lake), and Table 2 (Vangorda).

Table 1 Metallurgical result of Swim Lake ore (1)

Product	wt. (%)	(assay %)				(distribution %)			
		Cu	Pb	Zn	Fe	Cu	Pb	Zn	Fe
Head(calc'd)	100	0.22	3.64	4.41	25.33	100	100	100	100
Pb concentrate	5.0	0.26	52.18	6.64	12.42	6.1	71.7	7.5	2.5
Pb-cl-tail	4.5	0.83	11.71	6.66	29.12	17.2	14.5	6.8	5.1
Zn concentrate	6.3	1.11	1.40	52.68	9.00	32.6	2.4	75.3	2.2
Zn-cl-tail	6.7	0.66	1.40	3.80	26.68	19.0	2.6	5.8	7.1
Final tail	77.5	0.07	0.41	0.26	27.15	25.1	8.8	4.6	83.1

Table 2 Metallurgical result of Vangorda ore (1)

Product	wt. (%)	Cu Pb Zn Fe				Cu Pb Zn Fe			
		(Assay %)				(distribution %)			
Head (calc'd)	100	0.14	4.01	4.91	20.02	100	100	100	100
Pb concentrate	6.2	0.45	49.85	10.16	10.16	19.9	77.0	12.8	3.2
Pb-cl-tail	3.1	0.89	15.88	12.25	20.75	19.8	12.3	7.8	3.5
Zn concentrate	6.0	0.38	2.18	49.43	9.52	16.3	3.3	60.4	2.9
Zn-cl-tail	13.8	0.19	1.40	3.40	35.64	18.5	4.8	9.5	24.6
Final tail	70.9	0.05	0.15	0.66	18.60	25.5	2.6	9.5	65.8

Reagents used (Lb./ton)

	Swim Lake ore	Vangorda ore
Pb flotation		
Na ₂ CO ₃	2.8 (pH=10)	2.0 (pH=10)
NaCN	0.5	0.4
Dow#250	0.03	0.05
A.C.C.#25	0.14	0.22
A.C.C.#31	0.17	0.18
Zn flotation		
Ca(OH) ₂	2.0 (pH=10)	1.2 (pH=10)
CuSO ₄	0.8	0.8
Nikko#125	0.20	0.20
Ethyl xanthate	0.20	0.11

2). Cu-Pb-Zn differential flotation

Before Pb flotation, Cu flotation was tried by the aid of sulphurous acid which is widely used in treating complex sulphide ores.

Flowsheet is shown in Fig.2 and typical metallurgical results are shown in Table 3. (Swim Lake), and Table 4. (Vangorda).

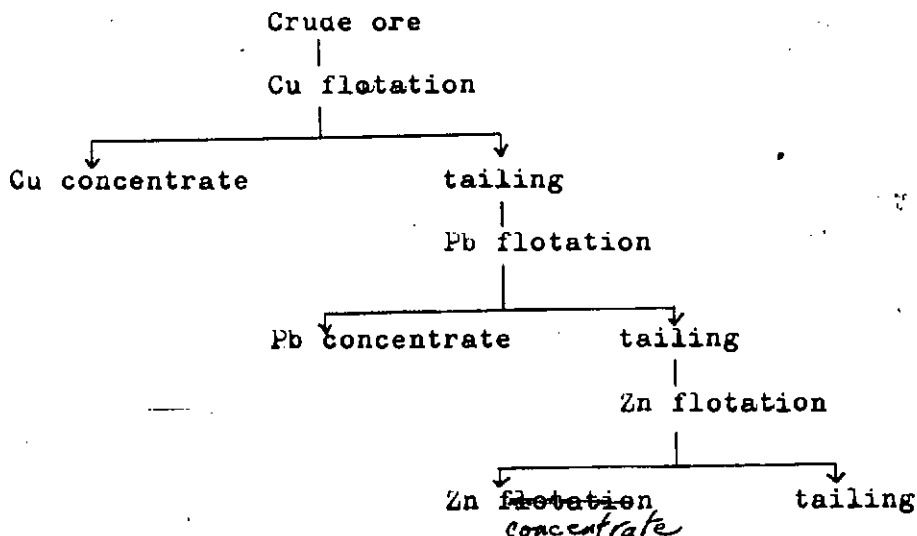


Fig.2 Flowsheet of Cu-Pb-Zn differential flotation

Table 3 Metallurgical result of Swim Lake ore (2)

Product	wt.(%)	(assay %)				(distribution %)			
		Cu	Pb	Zn	Fe	Cu	Pb	Zn	Fe
Head(calc'd)	100	0.22	3.25	4.37	24.19	100	100	100	100
Cu concentrate	0.9	11.73	4.63	5.38	26.33	49.1	1.3	1.1	1.0
Pb concentrate	3.6	0.07	53.89	6.39	9.69	1.4	59.7	5.3	1.4
Pb-cl-tail	6.7	0.12	10.36	7.15	19.86	3.7	21.3	10.9	5.5
Zn concentrate	5.7	0.39	1.81	48.88	11.13	10.2	3.2	63.7	2.6
Zn-cl-tail	11.3	0.31	3.53	4.85	29.27	16.2	12.3	12.6	13.7
Final tail	71.8	0.06	0.10	0.39	25.53	19.4	2.2	6.4	75.8

Table 4. Metallurgical result of Vangorda ore (2)

Product	wt.(%)	(assay %)				(distribution %)			
		Cu	Pb	Zn	Fe	Cu	Pb	Zn	Fe
Head(calc'd)	100	0.12	4.18	5.25	20.11	100	100	100	100
Cu concentrate	0.8	6.81	11.52	4.72	30.85	44.7	2.2	0.7	1.2
Pb concentrate	6.7	0.06	49.10	10.31	10.09	3.3	78.7	13.2	3.3
Pb-cl-tail	1.6	0.11	10.93	9.53	22.00	1.6	4.1	2.9	1.8
Zn concentrate	7.4	0.44	4.05	49.03	11.05	26.0	6.7	64.4	3.9
Zn-cl-tail	6.9	0.21	2.80	5.53	23.93	12.2	4.6	7.3	8.2
Final tail	76.6	0.02	0.20	0.79	21.41	12.2	3.7	11.5	81.6

Reagents used (Lb./ton)

Cu	Swim Lake ore	Vangorda ore
Pb flotation		
H ₂ SO ₃	(pH=5.3)	(pH=5.2)
Dow#250	0.05	0.05
A.C.C.#208	0.32	0.34
Pb flotation		
Na ₂ CO ₃	3.8 (pH=10)	5.0 (pH=10)
NaCN	0.45	0.32
A.C.C.#25	0.45	-
A.C.C.#31	0.43	0.46
Zn flotation		
Ca(OH) ₂	(pH=10)	(pH=10)
CuSO ₄	1.0	1.0
Nikko#125	0.3	0.2
Ethyl xanthate	0.27	0.13

The above-mentioned is outline of our batch flotation tests. We expect better result in case of continuous operation.

Notes:

1. As a result of microscopic examination, galena, sphalerite, iron pyrite and small amount of chalcopyrite was found as valuable minerals.
2. In the case of Cu-Pb-Zn differential flotation, Cu flotation tailing was reground prior to Pb flotation.
3. Number of stage of cleaning in each flotation test is as follows.

	Cu	Pb	Zn
Swim Lake ore (1)	-	3	2
(2)	2	4	3
Vangorda ore (1)	-	3	3
(2)	2	3	2